Time : 3 Hours   Max.Marks : 100

PART - A

(10 x 2 = 20 Marks)

ANSWER ALL QUESTIONS

1.   State Stoke's theorem.

2.   Define dot and cross product of two vectors.

3.   Differentiate absolute and relative electric potential.

4.   State Laplace and Poisson's equation.

5.   Find the force experienced by electron when it moves at a velocity of 200 m/sec at right angles to uniform magnetic field of 1 Tesla.

6.   Give the formula for emf induced in a Faraday's disc generator.

7.   Define displacement and conduction current.

8.   Express energy stored in magnetic field in terms of inductance of the system.

9.   Define standing wave ratio.

10. A plane traveling electromagnetic wave passes through glass with relative permittivity is 3. Find the velocity of propagation.

PART - B

(5 x 16 = 80 Marks)

ANSWER ALL QUESTIONS

11.(a)   Verify divergence theorem for $F = x^2 i + z j + yz k$ taken over the cube bounded by x=0,x=1,y=0,y=1,z=0,z=1.

(OR)

11.(b)   Prove the identity (i) Curl Curl A = Grad div.A - ∇^2 A (ii) div curl A=0.

12.(a)   Derive the expression for electric field intensity due to uniformly charged disc and uniformly charged infinite sheet.

(OR)

12.(b)   (i) A parallel plate capacitor consists of two plates 30cm x 30cm spaced 2mm apart and 2 dielectric each 1mm thick having relative permittivities of 3 and 5. If the potential difference between the plates is 5000 V. Calculate the voltage gradient in each dielectric.

(ii) Derive the expression for the electrostatic energy stored in capacitor.

13.(a)   Derive the expression for magnetic field intensity due to a wire carrying a current I.

(OR)

13.(b)   A uniformly wound cylindrical coil in the form of a solenoid of 2000 turns is 50 cm long and 5 cm in diameter. If the coil carries a current of 5 mA, find the flux density i) at the center of the coil ii) on the axis at one end of the coil iii) on the axis half way between the center and end of the coil.

14.(a)(i)   Derive Maxwell's equation in differential form (ii) state the similarities and dissimilarities between circuit theory and field theory.

(OR)

14.(b)   State and explain Faraday's law of electromagnetic induction.

15.(a)   Derive the expression for wave propagation in lossy and lossless dielectric medium.

(OR)

15.(b)   At a frequency of 100 MHz, the following values are obtained for certain transmission line, L = 0.25 μH/m, C= 80 pF/m, R=0.15 Ω/m and G= 8 μ mho/m. calculate the values for α, β, γ, v and Z_0.

*****THE END*****